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Dairy Herd Improvement Letter

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NATIONAL COOPERATIVE DAIRY HERD IMPROVEMENT PROGRAM
A dairy recordkeeping plan for every herd

- State and National Standardized Lactation Averages by Breed for Cows on Official Test, Calving in 1979
- Changes in the AIPL Genetic Evaluation Procedures

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STATE AND NATIONAL STANDARDIZED LACTATION AVERAGES BY BREED FOR COWS ON OFFICIAL TEST, CALVING IN 1979

By Rex L. Powell[1]

Dairy records processing centers provide lactation records to USDA for research that includes genetic evaluations. Records only from cows on official test are used in genetic evaluations. Nearly half of the official records are not used because of missing sire identification or failure to pass USDA edits.[2] [3] Most of these unusable records are from grade cows and are not usable because of missing sire identification. The number of records and average standardized production of lactations initiated in 1979 that contributed to genetic evaluations are reported by State in table 1 for Ayrshire, Guernsey, and Holstein cows and in table 2 for Jersey, Brown Swiss, and Milking Shorthorn cows. Records were standardized for age and month of calving[4] and times milked per day.[5] Incomplete records were projected to 305 days.[6] Thus, the averages presented are on a 305-day, two-times-a-day, mature-equivalent basis. This is the second report of lactation averages with incomplete records projected by the factors of Wiggans and Powell.[6] Fat percentages were computed from the average standardized milk and fat yields.

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[1] Research geneticist (animal), Animal Improvement Programs Laboratory, Animal Science Institute, Beltsville Agricultural Research Center, Beltsville, Md. 20705.

[2] Wiggans, G. R. Errors, reasons for termination, and types of test for 305-day lactation records received for the Summer 1978 through Winter 1980 Sire Summaries. U.S. Dept. Agr. Dairy Herd Impr. Ltr. 56(6), pp. 7-13. 1980.

[3] U.S. Department of Agriculture. Editing of lactation records used in USDA-DHIA genetic evaluations of sires and cows. U.S. Dept. Agr. Dairy Herd Impr. Ltr. ARS-44-222, 46(6), 32 pp. 1970.

[4] Norman, H. D., Miller, P. D., McDaniel, B. T., and others. USDA-DHIA factors for standardizing 305-day lactation records for age and month of calving. U.S. Dept. Agr. ARS-NE-40, 91 pp. 1974.

[5] U.S. Department of Agriculture. Reducing records to a twice-a-day milking basis. U.S. Dept. Agr. Dairy Herd Impr. Ltr. 48(1), pp. 3-8. 1972.

[6] Wiggans, G. R., and Powell, R. L. Projection factors for milk and fat lactation records. U.S. Dept. Agr. Dairy Herd Impr. Ltr. 56(1), 15 pp. 1980.

Tables 1 and 2 were compared with corresponding tables for 1978 calvings.[7] The number of records increased by 7 percent over 1978 numbers primarily because of an 8 percent increase for Holstein records. The number of records also increased for Jerseys (6 percent), Brown Swiss (3 percent), and Milking Shorthorns (6 percent). The number of Ayrshire records increased by 2 percent from 1978, following a 2 percent decrease in 1978 compared with 1977 records. The number of Guernsey records declined by 2 percent.

Average milk production increased for all breeds from 82 pounds for Milking Shorthorns to 270 pounds for Holsteins. Average fat yield also increased for all breeds by 4 to 10 pounds. Fat percentage change varied, increasing slightly for Guernseys (0.02), Brown Swiss (0.01), and Milking Shorthorns (0.01) and decreasing slightly for Holsteins (0.01), Jerseys (0.01), and Ayrshires (0.02).

The national averages for alternate years from 1971 through 1979 are given in table 3. The total number of records increased by 39 percent since 1971. Increases were 50 percent for Holsteins and 12 to 15 percent for Jerseys, Brown Swiss, and Milking Shorthorns. Ayrshires essentially have maintained their numbers, whereas Guernseys have decreased by 34 percent. Increases in milk production since 1971 were from 866 (Brown Swiss) to 1,808 pounds (Holsteins). Fat production has increased but not in proportion to milk production because of a decrease in fat percentage since 1971 for all breeds, particularly Jerseys. Changes in numbers of records and averages for particular State and breed combinations may be studied by comparing tables 1 and 2 with tables in the report[7] for 1978 and in corresponding publications for earlier years.

Cows of the Red and White breed are not included in the tables because of small numbers. Nationally, the 924 Red and White cows averaged 15,278 pounds of milk, 3.62 percent fat, and 554 pounds of fat. The averages for 687 cows in 1978 were 15,193 pounds of milk, 3.62 percent fat, and 550 pounds of fat.

Interpretation of changes in average production should be made in view of the many factors that can affect yield. Although genetic change is expected to have a positive effect on yield, feed availability and cost, milk and beef prices, and characteristics of herds entering and leaving official testing programs can affect the averages in either direction.

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[7] Powell, R. L. State and national standardized lactation averages by breed for cows on official test, calving in 1978. U.S. Dept. Agr. Dairy Herd Impr. Ltr. 57(1), pp. 1-4. 1981.

Table 1.--Number of records and State and national standardized lactation averages for Ayrshire, Guernsey, and Holstein cows on official test, calving in 1979[1]

State	Ayrshire				Guernsey				Holstein			
	Records	Milk	Fat	Fat	Records	Milk	Fat	Fat	Records	Milk	Fat	Fat
	Number	Pounds	Percent	Pounds	Number	Pounds	Percent	Pounds	Number	Pounds	Percent	Pounds
Alabama	76	12,386	3.61	448	162	10,283	4.23	435	5,203	15,692	3.44	540
Alaska	---	---	---	---	---	---	---	---	43	14,549	3.67	534
Arizona	1	11,956	3.85	460	896	11,997	4.43	531	6,949	17,841	3.51	626
Arkansas	17	10,669	3.88	414	202	10,798	4.45	480	2,968	15,666	3.40	532
California	212	14,193	3.88	551	2,519	12,546	4.52	568	139,196	18,661	3.57	666
Colorado	12	10,564	3.75	396	221	10,502	4.55	478	9,085	16,437	3.45	567
Connecticut	494	12,112	3.88	470	656	11,271	4.59	517	13,428	16,761	3.61	605
Delaware	143	11,696	4.21	492	10	12,264	4.88	599	2,040	17,089	3.57	611
Florida	169	11,164	3.43	383	543	9,330	4.07	380	2,913	15,488	3.31	513
Georgia	123	12,934	3.79	490	804	10,861	4.55	494	8,904	15,740	3.53	555
Hawaii	---	---	---	---	---	---	---	---	1,644	16,799	3.05	512
Idaho	58	12,591	3.59	452	352	11,145	4.56	508	10,381	16,873	3.47	586
Illinois	491	12,365	3.92	485	1,534	10,548	4.65	490	31,680	16,226	3.72	604
Indiana	332	12,832	3.91	502	3,045	11,456	4.75	545	23,520	16,581	3.67	609
Iowa	1,339	12,019	3.90	469	1,821	10,696	4.62	495	31,485	15,537	3.66	568
Kansas	529	11,165	3.78	422	526	10.558	4.57	483	24,011	15,575	3.53	550
Kentucky	221	11,087	3.74	415	406	9,884	4.59	453	9,630	15,646	3.56	557
Louisiana	115	10,918	3.57	390	1,069	10,134	4.27	432	6,285	14,761	3.29	485
Maine	441	12,553	3.91	491	267	11,356	4.60	523	14,468	16,791	3.51	589
Maryland	543	10,965	3.95	434	1,075	10,593	4.67	495	28,879	16,117	3.63	585
Massachusetts	561	11,522	3.97	458	325	11,401	4.52	516	11,657	16,495	3.57	588
Michigan	130	12,527	3.87	485	1,842	11,677	4.71	549	49,199	17,309	3.66	633
Minnesota	1,047	11,811	3.91	462	4,016	10,533	4.70	495	106,857	15,806	3.65	577
Mississippi	160	11,682	3.55	415	270	11,382	4.32	491	4,906	15,502	3.38	524
Missouri	88	12,416	3.92	487	1,688	10,632	4.62	491	19,107	15,702	3.56	559
Montana	162	15,061	3.75	565	76	13,117	4.86	638	1,438	16,291	3.48	568
Nebraska	126	10,285	3.92	403	530	10,454	4.56	476	11,367	15,061	3.58	540
Nevada	---	---	---	---	---	---	---	---	1,191	17,531	3.29	576
New Hampshire	539	13,364	3.90	521	152	10,512	4.40	463	7,596	16,772	3.60	604
New Jersey	40	11,832	3.79	448	147	11,024	4.69	517	9,173	16,916	3.64	615
New Mexico	169	13,855	3.76	521	504	12,401	4.36	540	6,879	17,244	3.50	603
New York	3,538	12,772	3.90	498	2,265	11,465	4.57	524	143,082	16,953	3.59	609
North Carolina	248	13,266	3.68	488	603	10,878	4.58	498	25,697	16,736	3.50	585
North Dakota	5	12,103	3.90	472	21	9,005	4.58	413	3,239	14.578	3.55	517
Ohio	1,179	12,441	3.86	480	2,802	11,377	4.69	533	45,311	17,193	3.64	627
Oklahoma	320	12,270	3.78	464	434	11,006	4.46	491	6,858	16,472	3.51	578
Oregon	326	12,509	3.90	487	1,052	11,458	4.64	532	11,934	17,553	3.57	626
Pennsylvania	1,446	13,268	3.96	525	4,693	11,403	4.70	536	129,194	16,839	3.67	618
Puerto Rico[2]	---	---	---	---	---	---	---	---	1,947	10,895	3.00	326
Rhode Island	145	11,845	4.11	486	38	7,787	4.54	354	733	16,022	3.70	592
South Carolina	---	---	---	---	1,751	11,647	4.63	539	6,645	16,000	3.55	569
South Dakota	3	9,873	4.14	408	31	10,075	4.86	490	5,598	15,181	3.64	553
Tennessee	101	11,843	3.78	447	609	10,759	4.42	476	12,818	16,699	3.50	585
Texas	22	9,747	4.08	397	349	11,660	4.58	534	13,713	16,658	3.50	584
Utah	5	13,602	3.75	510	2	11,341	4.03	457	11,610	17,329	3.41	591
Vermont	1,524	13,054	3.79	495	471	11,779	4.56	537	29,546	16,556	3.56	589
Virginia	521	12,942	3.71	480	1,699	10,844	4.55	493	46,428	16,293	3.53	575
Washington	413	13,576	4.04	549	2,097	12,460	4.81	600	24,838	18,006	3.56	641
West Virginia	326	11,464	4.16	477	307	9,242	4.61	426	7,015	15.988	3.47	555
Wisconsin	1,005	12,651	3.88	490	6,681	11,352	4.66	530	142,902	16,808	3.74	629
Wyoming	1	9,361	4.07	381	16	15,795	4.29	678	806	15,682	3.36	526
United States	19,466	12,492	3.88	484	51,579	11,231	4.63	519	1,271,996	16,792	3.61	606

[1] Dashes indicate no lactation records reported.

[2] Puerto Rican data are included in USDA national standardized lactation averages.

Table 2.--Number of records and State and national standardized lactation averages for Jersey, Brown Swiss, and Milking Shorthorn cows on official test, calving in 1979[1]

State	Jersey				Brown Swiss				Milking Shorthorn			
	Records	Milk	Fat	Fat	Records	Milk	Fat	Fat	Records	Milk	Fat	Fat
	Number	Pounds	Percent	Pounds	Number	Pounds	Percent	Pounds	Number	Pounds	Percent	Pounds
Alabama	2,214	11,851	4.50	534	124	11,968	3.87	463	---	---	---	---
Alaska	---	---	---	---	---	---	---	---	---	---	---	---
Arizona	1,069	11,568	4.89	566	798	15,355	3.82	587	42	11,713	3.44	403
Arkansas	797	9,575	4.72	452	92	13,810	3.87	535	66	12,586	3.67	461
California	6,911	11,998	5.06	607	734	14,577	4.11	599	124	13,378	3.58	478
Colorado	280	10,906	4.48	488	476	13,486	4.09	552	24	8,183	3.88	318
Connecticut	377	10,802	4.84	523	226	13,490	3.90	526	18	10,772	3.40	366
Delaware	22	10,709	4.55	487	8	15,695	4.03	633	---	---	---	---
Florida	874	10,055	4.42	444	437	12,512	3.62	453	---	---	---	---
Georgia	1,417	10,008	4.84	484	324	13,853	3.96	549	---	---	---	---
Hawaii	---	---	---	---	---	---	---	---	---	---	---	---
Idaho	1,146	10,476	4.86	509	96	14,373	3.87	556	24	11,166	3.42	382
Illinois	1,016	9,331	4.83	450	1,336	13,093	4.05	530	211	11,494	3.62	416
Indiana	1,601	9,990	4.95	494	830	14,224	4.02	571	57	10,721	3.53	379
Iowa	1,971	10,172	4.80	488	2,824	13,260	4.02	533	359	11,001	3.70	407
Kansas	616	9,858	4.67	461	362	12,669	3.90	494	4	12,138	3.42	415
Kentucky	2,072	10,403	4.80	499	266	11,651	3.90	454	19	10,065	3.37	340
Louisiana	2,069	9,875	4.62	456	123	10,185	3.78	385	---	---	---	---
Maine	1,373	11,948	4.75	567	105	12,237	3.97	485	86	9,729	3.53	344
Maryland	519	8,571	4.82	413	274	13,309	3.95	525	42	9,677	3.58	346
Massachusetts	1,154	10,533	4.89	515	56	13,492	3.83	517	36	10,276	3.71	382
Michigan	1,649	10,910	5.01	546	318	13,772	4.08	562	80	12,321	3.44	423
Minnesota	2,158	10,152	4.89	497	1,398	13,152	4.06	534	517	11,998	3.67	440
Mississippi	1,655	10,026	4.49	450	5	10,928	3.97	434	---	---	---	---
Missouri	1,804	10,462	4.74	496	561	12,769	3.98	508	158	10,470	3.68	386
Montana	5	11,473	4.57	525	35	13,763	4.05	558	---	---	---	---
Nebraska	185	9,264	4.65	431	477	12,917	4.13	534	174	9,329	3.79	353
Nevada	418	12,380	4.64	575	1	12,569	3.73	469	---	---	---	---
New Hampshire	1,009	11,102	4.74	526	85	12,933	3.87	500	30	11,013	3.76	414
New Jersey	250	12,589	4.77	600	123	12,988	3.97	515	---	---	---	---
New Mexico	4	11,131	4.77	531	13	11,422	4.22	482	---	---	---	---
New York	4,609	10,774	4.89	527	1,746	14,028	3.97	557	46	12,178	3.61	440
North Carolina	1,868	10,917	4.71	514	287	13,653	4.03	551	---	---	---	---
North Dakota	70	8,863	4.88	433	134	13,404	3.98	533	3	9,543	3.42	327
Ohio	4,787	10,786	5.01	540	1,522	14,678	4.13	606	131	11,782	3.83	452
Oklahoma	648	10,171	4.61	469	329	12,384	3.89	482	217	13,311	3.53	470
Oregon	3,650	11,323	4.98	564	745	13,771	4.04	557	20	10,765	3.44	370
Pennsylvania	4,362	10,770	4.99	538	927	13,808	4.05	559	52	9,718	3.70	360
Puerto Rico[2]	---	---	---	---	5	9,921	2.93	291	---	---	---	---
Rhode Island	2	10,749	3.82	411	3	11,475	3.86	443	---	---	---	---
South Carolina	4,251	11,259	4.86	547	82	13,114	3.72	487	---	---	---	---
South Dakota	116	9,833	5.16	507	296	12,163	4.14	503	97	9,642	3.56	343
Tennessee	4,323	10,944	4.69	513	408	13,464	3.98	536	---	---	---	---
Texas	3,760	10,577	4.65	492	1,191	14,458	3.89	562	23	13,083	3.79	495
Utah	679	11,485	4.83	554	106	13,477	4.02	542	3	19,272	3.87	747
Vermont	5,812	11,076	4.75	526	144	15,650	3.89	608	45	11,506	3.49	402
Virginia	841	10,993	4.81	529	135	13,565	3.83	519	6	13,675	3.74	512
Washington	3,594	11,836	5.06	599	232	14,802	4.05	599	47	15,159	3.46	525
West Virginia	281	11,794	4.60	543	1	13,093	3.91	512	---	---	---	---
Wisconsin	2,848	10,451	4.88	510	3,411	13,928	4.06	566	255	11,973	3.62	434
Wyoming	28	9,784	4.66	456	2	13,878	4.09	568	---	---	---	---
United States	83,164	10,887	4.84	527	24,213	13,676	4.01	548	3,016	11,497	3.63	418

[1] Dashes indicate no lactation records reported.

[2] Puerto Rican data are included in USDA national standardized lactation averages.

Table 3.--Number of records and national average production for 6 breeds calving in 1971-79

Breed	Year of calving					Change, 1971-79	
	1971	1973	1975	1977	1979	Amount	Percentage
				Records (number)			
Ayrshire	19,478	18,683	18,695	19,467	19,466	-12	-0.1
Guernsey	78,691	69,680	62,149	56,246	51,579	-27,112	-34.5
Holstein	850,379	919,735	1,014,257	1,143,648	1,271,996	+421,617	+49.6
Jersey	74,132	71,557	71,812	76,785	83,164	+9,032	+12.2
Brown Swiss	21,001	21,057	21,635	23,553	24,213	+3,212	+15.3
Milking Shorthorn	2,635	2,442	2,648	2,693	3,016	+381	+14.5
				Milk (pounds)			
Ayrshire	11,457	11,322	11,730	12,167	12,492	+1,035	+9.0
Guernsey	10,231	10,133	10,573	11,003	11,231	+1,000	+9.8
Holstein	14,984	14,837	15,528	16,354	16,792	+1,808	+12.1
Jersey	9,528	9,588	10,150	10,546	10,887	+1,359	+14.3
Brown Swiss	12,810	12,658	13,063	13,502	13,676	+866	+6.8
Milking Shorthorn	10,217	10,182	10,596	11,448	11,497	+1,280	+12.5
				Fat (percent)			
Ayrshire	3.91	3.90	3.90	3.89	3.88	-.03	-.8
Guernsey	4.66	4.62	4.61	4.59	4.63	-.03	-.6
Holstein	3.63	3.64	3.65	3.61	3.61	-.02	-.6
Jersey	4.99	4.94	4.90	4.83	4.84	-.15	-3.0
Brown Swiss	4.03	3.99	3.97	3.96	4.01	-.02	-.5
Milking Shorthorn	3.66	3.64	3.64	3.61	3.63	-.03	-.8
				Fat (pounds)			
Ayrshire	448	442	457	473	484	+36	+8.0
Guernsey	477	469	487	506	519	+42	+8.8
Holstein	545	540	566	591	606	+61	+11.2
Jersey	476	473	497	510	527	+51	+10.7
Brown Swiss	516	505	519	535	548	+32	+6.2
Milking Shorthorn	374	371	386	414	418	+44	+11.8

CHANGES IN THE AIPL GENETIC EVALUATION PROCEDURES

By George R. Wiggans and Rex L. Powell[1]

The primary mission of the Animal Improvement Programs Laboratory (AIPL) is to develop and apply improved methods for genetic evaluation of dairy cattle. Procedures for computing and distributing genetic evaluations are changed occasionally to improve the accuracy and to enhance the usefulness of the evaluations.

The following changes were implemented in recent genetic evaluation runs.

July 1981

Evaluations for maternal grandsires were incorporated into Cow Indexes (CI's) for cows with dams that do not have CI's. The Elite CI was made more selective by raising the CI Dollars requirement. Requirements were eliminated for specific levels of mature-equivalent yield or deviations from modified contemporary averages so that the Elite CI would be based more specifically on genetic superiority.

The minimum number of records used in computing the percentage of first lactation records culled in Sire Summaries was increased from 10 to 20.[2] Therefore, at least 20 daughters of a bull must have calved for the first time a year or more before the cutoff date for a Sire Summary run, or the percentage culled was not computed.

Procedures to compute evaluations for bulls used in Mexico were changed to resemble more closely the procedures used for U.S. bulls. Record correction, edit, adjustment, and recycling and resummarization criteria were affected. A master file was initiated, and incomplete records were projected based on last sample-day production. The first CI's for cows in Mexico were computed and distributed.

January 1982

Type-of-test codes were expanded to two digits; thus, they allowed for an expansion in the number of plans and uniform coding at dairy records processing centers (DRPC's). This change necessitated revisions in record formats and computer programs.

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[2] Powell, R. L. Computation and interpretation of the percentage of first lactation records culled in Sire Summaries. U.S. Dept. Agr. Dairy Herd Impr. Ltr. 57(2), pp. 6-9. 1981.

Adjustment for three-times-a-day milking was changed to conform with the adjustment presented by Wiggans and Grossman.[3] This change affected records with fewer than 305 days in milk.

As an aid in distributing CI information, the DRPC code and animal control number were added to the CI record.

Editing procedures for records of Red and White cows were changed to allow for records of registered cows with grade dams. The Red and White Dairy Cattle Association registers cows with grade parents.

Responsibility for the test herds used by the DRPC's to check the accuracy of their computing systems was shifted from AIPL to the Quality Certification Service of the National Dairy Herd Improvement Association, Inc. Several standard herds were created and processed by the DRPC's. A summary of lactation records from these herds was prepared by AIPL.

July 1982

A CI now is distributed to DRPC's and breed organizations whenever recalculated, regardless of whether a cow has a current lactation record. Previously, only CI's for cows with recent lactations were distributed even though a new CI was computed each time a cow's sire was evaluated. Cows still must have calved in the 2 years prior to the cutoff date of a Sire Summary run to be considered for Elite status.

The National Association of Animal Breeders' bull code number was included in the USDA-DHIA Active AI Sire Summary. Information from the Sire Summaries for solids-not-fat (SNF) and protein was integrated into the USDA-DHIA Active AI and USDA-DHIA Complete Sire Summaries. This consolidation facilitated the use of Sire Summaries and reduced bulk and cost. Recipients of Sire Summaries were limited to one copy each.

Lists of lactation records with SNF and protein percentages outside acceptable limits were returned to the DRPC's. However, these lists did not include all excluded records.

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[3] Wiggans, G. R., and Grossman, M. Adjusting records from three-times-a-day to two-times-a-day milking basis. U.S. Dept. Agr. Dairy Herd Impr. Ltr. 56(4), pp. 7-8. 1980.

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